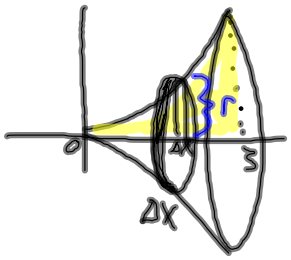
7.3 volumes

rotate the area bounded by $y=x^2$, x axis
$x=0$, $x=3$
about the x-axis



ΔV_i volume of one disk

$\Delta V_i = \pi r_i^2 \Delta x$

$V \approx \sum_{i=1}^{n} \pi r_i^2 \Delta x$ (n disks)

$V = \lim_{\Delta x \to 0} \sum_{i=1}^{n} \pi r_i^2 \Delta x$ ($n \to \infty$)

$V = \int_a^b \pi r^2 \, dx$

need to be function of x

$r = f(x) = y = x^2$

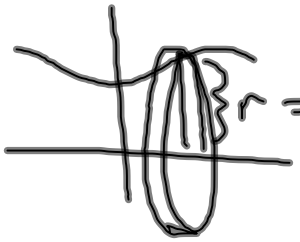
$\int_0^3 \pi (x^2)^2 \, dx = \frac{243\pi}{5}$ or 152.681

Jan 19-9:12 AM

$y = 2 + x\cos x$, x axis, $[-2, 2]$

rotate about x-axis

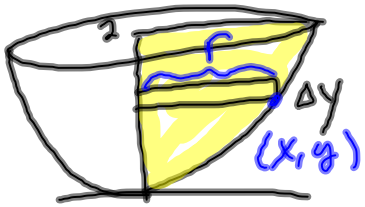
$\int_a^b \pi r^2 \, dx$ disk method



$\int_{-2}^{2} \pi (2 + x \cdot \cos(x))^2 \, dx$

52.4288

Jan 19-9:40 AM



$y = x^2$, $x = 0$, $y = 0$, $y = 2$

rotate around y-axis

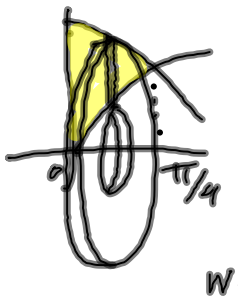
$\int_c^d \pi r^2 \, dy$ $\quad r = x \quad x = \sqrt{y}$

$\int_0^2 \pi (\sqrt{y})^2 \, dy$

c, d - limits for y

r needs to be in terms of y

Jan 19-9:47 AM



y-axis

$y = \sin x$, $y = \cos x$, $x = 0$

rotate around x-axis

washers $\int_a^b \pi R^2 - \pi r^2 \, dx$ vertical rectangles

R - big radius

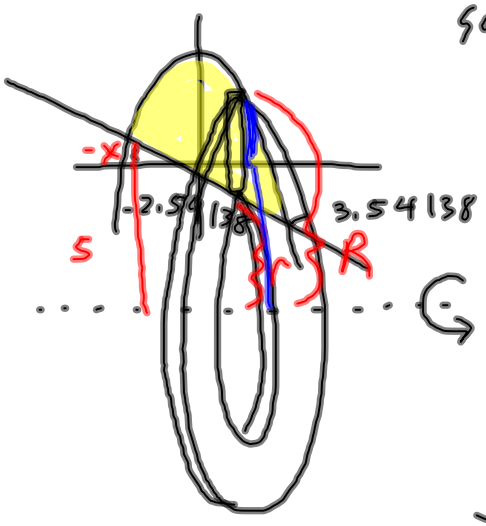
r - radius of hole $\int_c^d \pi R^2 - \pi r^2 \, dy$ horiz rect

$\pi \int_0^{\pi/4} \cos^2(x) - (\sin(x))^2 \, dx = \frac{\pi}{2}$

Jan 19-9:52 AM

$y = 9 - x^2$ $y = -x$ around the line $y = -5$

solve $(9 - x^2 = -x, x)$



$R = 5 + 9 - x^2$

$r = 5 + -x$

$y = -5$

$$\int_{-2.54138}^{3.54138} \pi(5+9-x^2)^2 - \pi(5-x)^2 \, dx$$

Jan 19-10:01 AM

7.3 9, 10, 11, 18, 20, 29 a, c, 34 a, c, 49

Jan 19-10:14 AM